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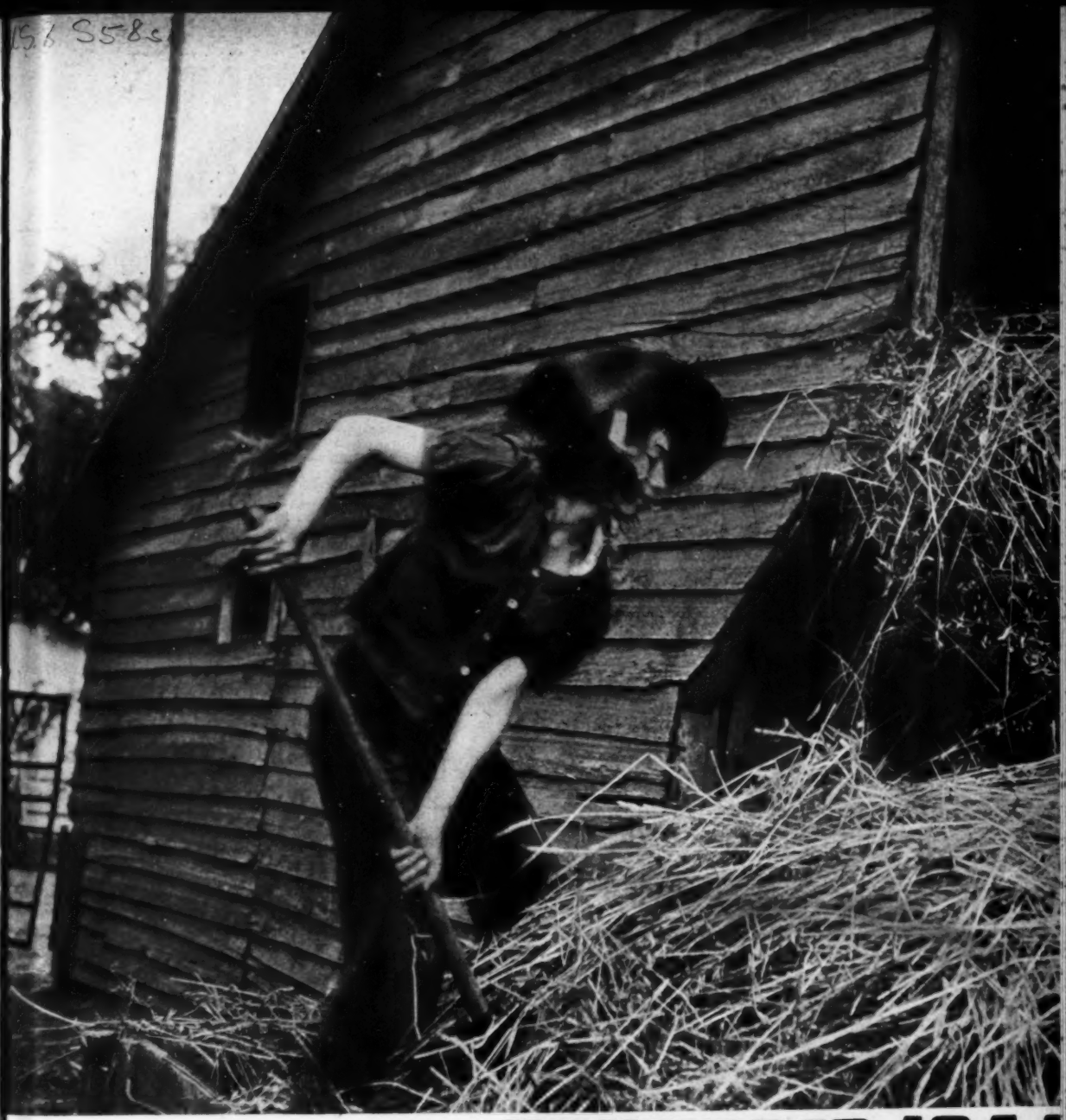

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SOIL CONSERVATION

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SOIL CONSERVATION

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WELLINGTON BRINK EDITOR

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Front Cover: Miss Clare Eckles, lovely Georgia farm lass, seen also in pictures on page 95. Photographer: Barrington King.

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Diversification comes to Texas Blackland

By GORDON WEBB

Wallin stands in a field of hubam clover in full bloom.

In late May, after 49 days of grazing by 26 head of cattle and 50 sheep, hubam clover in this 8-acre field almost hides some of the cows. The pasture, it must be conceded, is a bit ahead of the cows, indicating that the grazing program may still be subject to revision. (Upper right)

Jones Wallin finds soil conservation profitable on his 248 acres of blackland in Williamson County, Tex. Annual gross income (figured at 1935-37 prices) increased $1,799 in the years 1940-43. With the upsurge in prices, however, his gross income actually has risen from $3,196 to $7,469 annually. That's more than $17 an acre.

Wallin's books show that he is getting 40 bushels of corn where 20 used to grow, 250 pounds of lint cotton instead of 167 pounds, 40 bushels of milo as compared with 30 bushels, and 4 tons of non-legume hay where 3 formerly were harvested.

Walk over his fields and you must agree with him that erosion has been controlled. When he developed a conservation farming plan in June 1938 with the help of Soil Conservation Service technicians at Pflugerville, erosion was active on all but 14 acres of his farm. Between 25 and 75 percent of the topsoil had washed from 189 acres. More land was going down the creek every year. With assistance, first from the Soil Conservation Service and more recently from the Taylor Soil Conservation District which he and other landowners organized, Wallin has established every planned practice.

This farm isn't tied to a cotton row any more. Where cotton once accounted for 81 percent of gross income, it now represents 54 percent because diversification has come with soil conservation. Wallin has reduced his cotton acreage 45 percent but total production has fallen only 18

EDITOR'S NOTE.—The author is in the regional division of information, Soil Conservation Service, Fort Worth, Tex.

percent because of higher yields. His farm now averages 39 percent more corn from 45 percent fewer acres. These acreage reductions in cotton and corn have enabled Wallin to plant more milo and hay, to add 36 acres of hubam clover, and to enlarge his pasture by 5 acres.

This Williamson County farmer always has fed home-grown feed to livestock, including 4 work animals. But before the adoption of a soil conservation program the annual income from livestock was $345 *less* than the value of feed fed on the farm. Now he received $732 a year *more* from livestock than the value of home-grown feed at today's prices. Before his conservation work he had 4 dairy cows, 100 chickens, and 6 hogs. Today he keeps an average of 6 dairy cows, 7 beef cows, 425 chickens, 15 hogs, 28 ewes, and 65 turkeys.

Wallin has converted weed-grown waste land along the branch into good, erosion-resisting pasture which has helped him to get into a livestock production program. This land was fenced and sodded to Bermuda grass. Sheep help to control the weeds.

Thirty acres of pasture before soil conservation provided only 108 animal unit months of grazing a year. "Animal unit month" is the term used to describe one month's grazing by one cow. Thirty-five acres now provide 600 animal unit months of grazing annually. Sudan and oats add 66 animal unit months of grazing each year. Both oats and sudan are new crops on this farm.

Good pastures have been the exception in the Blacklands largely because cotton or corn grew almost to the doorsteps. If a small creek or drain ran through the place, it was fenced and called pasture. Many "pastures" had been cultivated until they were too eroded to pay a profit in cotton or corn. These pastures, without soil conservation and management practices, are little better than what Texans call "stomp lots."

That's why a Blackland pasture growing enough forage on two acres for three cows, as Wallin's does, is outstanding.

Wallin's success with hubam clover is significant to farmers throughout the 11 million acres of the Texas Blacklands. Ten years ago one of the greatest needs of Blackland agriculture was a satisfactory legume to be included in a crop rotation. A legume was wanted that would survive cotton root rot, that would make a vigorous growth for green manure, that could be used for hay and grazing, and that would produce an abundant seed crop. Farmers are slow to grow big acreages of soil improving crops if they have to buy seed every year.

One of the several legumes tried by Soil Conservation Service technicians and farmers was hubam clover, an annual form of biennial white sweet clover.

Six years ago the Soil Conservation Service gave 60 pounds of this legume seed to Wallin because seed was still difficult to obtain. In 1943, one of his biggest cash crops was hubam clover seed. He harvested 300 pounds an acre from 36 acres, kept enough to plant 50 acres, and sold the remainder for $1,400. The price in his community last year was $13.50 per hundred pounds.

On this farm, hubam clover is cash crop, soil improvement crop, hay producer, and supplemental pasture.

Last year Wallin gathered 260 pounds more seed cotton following hubam. He also grew 53 bushels of corn an acre on land where the legume had been turned under as green manure. It was land that formerly produced 12 to 25 bushels an acre, and averaged 20. One year he measured corn yields following two methods of handling the clover. Where it was plowed under green, 48 bushels of corn an acre were harvested; where seed was taken and the stalks turned under, the yield was 40 bushels. Where no hubam had been grown, corn produced only 30 bushels. Many farmers take a hay crop early in the season, and a seed crop from the second growth. Wallin's hay production has averaged 3 tons an acre.

As to the grazing value, the Williamson County farmer pointed to an 8-acre field. He said 26 cattle and 50 sheep had been grazing there since the first of April 1944, or for 49 days, and the animals were still belly-deep in clover. Five dairy cows had doubled their milk production, and Wallin said he had bought another 10-gallon can to help hold the extra milk.

Hubam clover also improves soil conditions. Water is absorbed more readily and in greater quantities. Heavy clay soils become granulated, a highly desirable condition, and are much easier to plow when the legume is used in the rotation.

Work at the Texas Blackland Experiment Sub-Station at Temple, in Bell County attests the soil improvement value of hubam clover, and in two instances shows a remarkable reduction in root rot damage to cotton where the legume is included in a rotation. This fact is extremely important to Blackland farmers who may find 10 to 52 percent of their cotton plants dead of root rot by early September when hubam is not in the rota-

tion. The experiment station reported that in a rotation of cotton and hubam for seed 3.5 percent of the cotton had been killed by root rot in September, as compared with 27.2 percent in a cotton-corn rotation and 39.8 percent in continuous cotton. These figures are averages for the three years ending in 1943.

"In the past," the experiment station reported in December 1943, "it has been considered economically unsound for Blackland farmers to devote a crop year to the production of a soil building legume. In addition to producing as much cotton in one year as continuous cotton produced in two years, the hubam in the cotton-hubam rotation produced an average of 352 pounds of seed per acre, which sold for 14 cents per pound in 1943. In the rotation where the hubam was used for hay 1.62 tons per acre were produced. Hubam can also be grazed either in a mixture with small grain or alone."

In the northern half of the Blacklands hubam should be planted in early spring; in the southern half fall planting is best. Seed are ready for harvest in July.

On Wallin's farm a crop rotation featuring hubam clover is only one of the practices that have been combined to make a complete soil conservation program.

All the 211 acres cultivated are farmed on the contour. Wallin's complete terrace system includes a farm water course to receive terrace water without erosion damage.

Although Wallin's achievements are outstanding, he is not alone among Blackland farmers in gaining greater production and greater income through soil conservation farming methods. Recently the Soil Conservation Service received reports from farmers whose conservation plans had been 70 to 100 percent established for at least two years. In this group are 454 Blackland farmers who operate 72,700 acres in soil conservation districts.

Today these 454 men are growing an average of 21 percent more cotton an acre, 37 percent more corn, 27 percent more non-legume hay, 13 percent more grain sorghum, 16 percent more wheat, 46 percent more peas, 60 percent more onions. Livestock carrying capacity of their pastures is 37 percent greater an acre. They have 10 percent fewer acres in cultivation and 62 percent more acres in pastures. Where they had 2,475 idle acres they now have only 62—and their plans call for putting even this land to work.

(*Continued on page* 110)

Friend From Victoria

Among recent distinguished visitors from abroad is the Honorable Sir A. Louis Bussau, for the past 6½ years Agent General for Victoria at London.

Sir Louis, returning to Australia after his long sojourn in England, stopped off in Washington the latter part of September for a few days with Soil Conservation Service officials in preparation for stop-overs in Texas and California. Being a "man of the land" himself, a freeholder with extensive grain and livestock interests in Victoria, he is keenly interested in soil conservation achievements in former dust-bowl areas and on irrigated land. He is also impressed with the idea of soil conservation districts and with the progress districts are making everywhere in the United States.

Sir Louis was a member of the first committee appointed in his homeland to look into erosion problems, a committee which filed its report in 1930.

Sir Louis is here seen giving his attention to a picture of a Texas watershed now under complete soil conservation.

Eckles redesigns his farm

By BARRINGTON KING

W. F. Eckles thinks he's found the secret of successful farming on his 138-acre farm near Waco, Ga., in Haralson County. The principle is so simple that he wonders how he overlooked it so long.

For 23 years, Eckles has lived on the same farm in the southwestern part of Haralson County. He has always been known in that section as a good farmer. He terraced his cropland, planted and cultivated on the contour, rotated his crops. He rarely failed to make a bale of cotton to the acre, which is nothing for any farmer to complain about. But somehow Eckles had the feeling that he wasn't doing as good a job of farming as might be done with his land.

Under consideration: a new border strip of perennial lespedeza sericea between field and woodland. W. F. Eckles, kneeling; Joe D. Tucker, district conservationist, at right.

That 7-acre field over back of the house, for instance, that he had quit cultivating because the land was washing badly and the yields were not large enough to give him an adequate return on labor, fertilizer, and seed; that 9-acre area of bottomland that was too wet to cultivate and had grown up to willows, alders, and other worthless growth; that 12 acres of upland pasture that just wouldn't produce enough grazing for his 4 milk cows and 3 mules during the hot, dry summer months—these were some of his problems.

EDITOR'S NOTE.—The author is in the regional information division, Soil Conservation Service, Spartanburg, South Carolina.

Shortly after the West Georgia Soil Conservation District was organized in 1939 by farmers of Haralson, Herd, Douglas, and Carroll Counties, Eckles decided to see what the district could do toward working out a complete soil conservation plan for his farm. As the first step, a detailed soil conservation survey was made, showing soil type, steepness of slope, degree and extent of erosion, and existing land use on every portion. With this information, Eckles and a technician of the Soil Conservation Service assigned to the district went over the fields, one by one, to plan the most efficient use of every acre.

The 7-acre field of idle land that was too steep and erodible for row crops could be put to productive use by kudzu, a deep-rooted perennial legume that would provide high-quality hay, and supplemental grazing during the late summer and fall drought. The 10-acre upland pasture was covered with good Bermuda grass sod and annual lespedeza, but the grazing capacity could be increased by an application of lime and fertilizer and by seeding hop clover for earlier grazing in the spring. Sericea lespedeza also could be seeded on a part of the pasture as another early grazing plant.

The survey information showed that the soil of the bottomland area that was too wet for cultivation would make excellent permanent pasture, if cleared of shrubby growth, fertilized and limed, and seeded to adapted pasture grasses, and legumes like Dallis grass, annual lespedeza, and white Dutch clover. A clear spring branch that flowed through the bottomland would provide water for cattle and other livestock.

On the cultivated land, existing terraces were found to be inadequate for handling the volume of water that ran off during heavy rains. So improved broad-channel terraces were planned, and to prevent surplus water from terraces from emptying on unprotected areas, new terrace lines were run so that the terraces would empty into natural draws or depressions. These natural drainageways were developed into broad meadow strips by seeding to sericea lespedeza, to protect the land from concentrated volumes of water from the terraces and to provide another source of perennial hay.

Strips of sericea were seeded also on steep, erodible slopes within cultivated fields and along the borders of fields and woodland, where shading by trees and competition with tree roots for plant

Straw rides are part of the farm job, too. Whether there's hay to be hauled to the barn or land to be plowed with the tractor, Clare Eckles and her two sisters pitch in and help their father get the work done on time.

"It's going to be a fine yield of wheat." Sara Eckles at left, Clare at right, examine the ripening heads of grain with Jane League, a girl from a neighboring farm.

food and moisture made it unprofitable to plant cultivated crops. These woodland borders of sericea would provide cover for quail and other insect-eating birds adjacent to the cropland where they could easily range out into the fields.

The sericea planted in his meadow outlets for terraces and in strips on the steeper slopes in his cultivated fields now totals about 6 acres. From these areas Eckles harvests about 9 tons of perennial hay each year in 2 cuttings. The kudzu on the 7 acres of formerly idle land furnishes additional hay, and supplemental grazing during dry periods that reduce the production of his permanent pastures, especially in late summer and fall.

"Ordinarily, I'd be planting cowpeas for hay at this time of year," Eckles said in mid-June, "but I've already cut three-quarters of a ton of hay per acre from my sericea and I'll get another cutting of hay and a seed crop from a part of my sericea later in the year."

Eckles used to plant about seven acres of small grain and follow the grain with cowpeas for hay. Now he plants 22 acres of small grain, including 16 acres of oats and 6 acres of wheat, and sows lespedeza on the grain in late February or early March.

"When I used to plant cowpeas after my grain was harvested in June I'd have to plow the land for the peas and that took a lot of labor just when I was busy with other crops," Eckles explained. "Sometimes it would be too wet to plow, sometimes it would be too dry to sprout the peas. And some-

Sacking grain as it comes through the combine is part of the fun of living on a farm for Clare Eckles. She and her sisters drive the tractor and handle other farm equipment during rush periods.

Once idle, eroded land now planted to kudzu. It provides good grazing on the Eckles farm when production of permanent pastures falls off during summer heat.

times a heavy rain would come just after the land was plowed and wash away a lot of loose topsoil.

"With lespedeza, all I have to do is to walk over the grain field in the late winter or early spring and scatter the lespedeza seed on the grain," he continued. "By the time the grain is ready to harvest, the lespedeza is already on the job and it makes rapid growth after the grain is cut. Another advantage about lespedeza is that it gives better protection for the land over a longer period than cowpeas."

Eckles leaves a part of his lespedeza on the land to reseed a second year and harvests the rest for seed, letting the stubble and straw remain on the land through the winter for soil protection and soil improvement. He harvests as much of his second-year lespedeza as he needs for hay, again leaving the stubble on the land over winter, and plants the land to row crops the following spring.

Land that has been in lespedeza two years is dark and loamy and easy to plow, and soaks up water like a sponge during heavy rains, storing the water in the land instead of permitting it to run off and carry away valuable topsoil. The organic matter added by the lespedeza builds up fertility as well as increasing the water-holding capacity of the soil.

"Droughts don't bother me nearly as much as they do some of my neighbors," Eckles says. "Lots of times I'll get a good stand of cotton or corn on land that's been in lespedeza, while folks all around me will be planting over."

Eckles plants about 24 acres of corn each year, in addition to his oats, for livestock feed. He has cut his acreage of cotton considerably. Back in 1936, he was planting 23 acres of cotton and had a tenant on halves. Now, with most of his land in permanent hay crops, improved pasture, small grain and lespedeza, he has reduced his cotton acreage and operates his entire farm without any outside help. Last year he planted 10 acres of cotton and this year he planted on 5 acres, which has materially reduced the labor formerly required for planting, cultivating, and picking.

At the same time, better land use and improved rotations have enabled Eckles to increase the per-acre yields of all crops. His average corn yields have been boosted from 15 to 25 bushels, oats from 25 to 55 bushels, and wheat from 10 to 20 bushels per acre. Last year he made twelve 500-pound bales of cotton on 10 acres.

Increased production of feed from 13 acres of perennial hay and from the increased acreages of improved pasture, small grain and lespedeza has enabled Eckles to increase his livestock. Since he started his conservation farming program 4 years ago, he has bought a purebed Aberdeen-Angus bull and 6 grade beef cows, and he is building up a herd of beef cattle. He has also increased his milk cows from 4 to 5. Counting yearlings and calves he now has 26 head of cattle.

The milk from the 5 milk cows is consumed in the home or used for raising calves, but he sells some surplus butter. Eckles has increased his poultry from 50 to 100 laying hens, and he raises 3 hogs each year for home use. Home-grown wheat is used for flour and for poultry and other livestock feed. He has a one-acre vegetable and truck garden that supplies the family with all the fresh vegetables they need and a surplus for sale.

In addition to the grain consumed on the farm, Eckles sells about $250 worth of wheat and oats and $400 worth of corn a year. He also sells about

$400 worth of sericea and annual lespedeza seed and seeds back about $200 worth of annual lespedeza seed each year on his own land. While saving the best heifer calves each year, he sells about $500 worth of steers, cows and veal and he expects to increase his livestock sales as his herd increases.

Since starting his conservation program 4 years ago, Eckles has bought a small tractor and a combine. He uses the tractor for breaking land and cultivating row crops, and hitches the combine to the tractor for harvesting his grain and his annual and sericea lespedeza seed.

Eckles hasn't any sons, but his three daughters operate the equipment and do other farm jobs as well as boys could. It's not a lark for them, because when there is land to be plowed or grain or hay to be cut, they pitch in and stick with the job until it's done. But they enjoy every minute of it.

Sixteen-year-old Charlotte and 15-year-old Sara learned to operate the tractor as soon as their father bought it. But Clare, now 13, wasn't permitted to run the machine until a year later, at 10. Eckles taught each daughter how to operate the equipment safely, and care for it properly.

Charlotte entered West Georgia College at Carollton in June. Eckles, the two younger girls, and Mr. Eckles' 84-year-old father do the work in the field, while Mrs. Eckles looks after the household duties, which include canning some 500 quarts of vegetables and fruit and about 350 pounds of dressed beef each year, with the help of the girls in their spare time.

All the members of the Eckles family work hard. But they live well. Farm jobs aren't a burden. The dark, loamy soil falling away from the plow in the spring, the bright green hay to be cut and the golden grain to be harvested in summer, the corn to be gathered when the cool days of autumn come—these are looked forward to with anticipation and tackled with the zest of healthful living.

"The farmer has been pictured too long as a rag-tag fellow, mining a bare living out of the soil because he doesn't know how to do anything else," Eckles says. "To my way of thinking, farming—if it's done right—is about the most interesting job there is. I may never make a fortune, but I'd rather farm than do any other kind of work."

That goes for the rest of the family too. They live the simple life, in daily contact with the sun and the rain, the air and the soil. They have found it good, and it has put the glow of health in their cheeks.

"Good livestock and machinery appeal to young people," Eckles says. "You can't expect them to get interested in the kind of farming that has nothing to offer but monotonous jobs of planting, chopping, and picking cotton year after year. But give them some livestock and machinery and they'll stay on the farm, instead of going off to get jobs in the mill."

Without adding a single acre to his farm, Eckles is building up a good herd of beef cattle, growing a wider variety of crops, developing new sources of income, improving the soil's fertility, and increasing crop yields, simply by using the soil resources he has more efficiently and setting up conservation measures to protect the land against erosion, in accordance with its capabilities and needs.

He has developed for improved permanent pasture the low-lying areas where moisture conditions are favorable for pasture grasses and legumes. He is producing virtually all the hay he needs from perennial hay crops of kudzu and sericea lespedeza on the steep, erodible areas not suitable for safe or profitable production of other crops. And he is growing his row crops in improved rotations on the more gently sloping areas of adapted soil types which are less susceptible to erosion.

"Good land use is the secret of successful farming," Eckles says. "Of course, you've got to have good terraces, good rotations, and apply lime and fertilizer, too. Those things are a part of using the land right. But if you don't put your row crops, your hay crops, and your pasture on the land where they ought to be, and use all your land for the crops it's adapted to grow, you're still going to find yourself going down hill."

Eckles is just one of more than 17,000 Georgia farmers who are carrying out programs of sound land use and conservation farming which they have developed with facilities available to them through the 21 local farmer-organized, farmer-operated soil conservation districts in the State. All these farmers are finding that conservation farming not only protects working capital but pays immediate dividends.

The old dream of diversified farming that people in the Land of Cotton have talked about so long is coming true in these soil conservation districts. It is coming about as a result of putting the South's diversified soils to their proper and diversified uses. That's what Eckles means when he says he's found the secret of successful farming on the ridges and hollows, the rolling land and branch bottoms on his Haralson County farm.

Otter Creek flood waters in spring of 1942, four miles south of Brandon, Vt.

"PRODUCTION INCREASES ARE STARTLING"

Thrilling reading to those who are friends of the American land is the saga of progress of many a soil conservation district. To my desk has come recently a simple "Report of the Otter Creek Soil Conservation District, July 2, 1941—December 31, 1943." It is an accounting to farmer members—nothing spectacular in tone or presentation, not written for consumption outside the district. It is merely one of many reviews periodically made to a district membership as an inventory of district business, problems and accomplishments. The Otter Creek Soil Conservation District is a legal sub-division of Vermont, one of more than 11 hundred soil conservation districts in the United States. From this report I take some excerpts for the insight they give into the workings of a typical up-to-its-job soil conservation district. I do so with acknowledgements to the five members of the district board of supervisors who sign the report: C. C. Seeley, Middlebury; John Kaldy, Jr., Florence; George Ash, New Haven; Walter Bryant, Shoreham, and Philip Eddy, Hinesburg.—THE EDITOR.

Originally, farmers were interested in forming the district to help them with community drainage problems on the LaPlatte River, Otter Creek, Little Otter Creek, and the land in the vicinity of the Shoreham Swamp. Many farmers also were interested in another community problem, the control of streambank erosion on valuable lowland fields lying adjacent to such mountain streams as the New Haven River, Cold River, Mill River and the Clarendon River.

After the district had been in operation a while, farmers (and the district supervisors who were elected to represent them and manage the affairs of the district) gradually became aware that the district offered possibilities for accomplishing other land use jobs not necessarily of a community nature, but nevertheless jobs which individual farmers have found difficult or impossible to complete with their own equipment and resources. Most of these jobs are of the type which requires detailed technical assistance for each farm, such as special advice and plans from agricultural engineers, agronomists, foresters or soils specialists, plus a need for machinery of the kind not usually owned by the farmer himself. There are several different types of such land improvement work needed throughout the district.

For instance, in the Champlain Valley the con-

struction and use of drainage or diversion ditches was essential to dry up the heavy clay soils in the spring and enable farmers to start spring work much earlier. In many parts of the district, field layouts and farm management plans need to be changed to increase production. Detailed surveys of each farm showing the soil, slope, amount of erosion and type of land use are now available to guide farmers and technical men working for the district in deciding exactly how fields should be managed.

About four-fifths of the land along Lake Champlain is open crop or pasture land where drainage and water disposal are very much needed and yet are often complicated and difficult to plan and construct. On much of the rolling cropland in this and other areas in the district, erosion is a serious problem. To meet it, farmers need detailed advice in contour farming, strip cropping and other erosion control measures.

The success or failure of dairying depends largely on the condition of the pastureland and the supply of water which is available. Particularly in the section along Lake Champlain, farmers are turning to the district for engineering assistance and the machinery necessary to construct farm ponds which will assure an adequate water supply for their dairy enterprises. In this and other sections also, pastures are run-out and covered with poverty grass. Through the assistance which the district can obtain from State and Federal agencies, we are trying to work out various methods to remedy this condition. In some places it is felt that the use of heavy harrows (perhaps of the bog harrow type) for preparing old pastures for reseeding will help in the solution of pasture problems. The construction of additional fences to divide pastures into two or more fields which can be grazed by the herd in rotation is another answer.

Outside of the Champlain Valley, woodland occupies from one-half to two-thirds of the land at the present time and its proper care and management can greatly increase the income of many land owners. Expert forestry assistance in cutting and marketing is needed on many farms before this can be done, however. Timber production can be greatly increased through such assistance and will also assure proper stocking of sugar orchards and prolong the lives of existing trees. Among other problems of woodland management are fencing out of woodland pasture, thinning, selective cutting and the sale of mature trees where not needed for sugar production. Throughout the district, farmers also need to make small plantings of black locust to provide a ready source of fence posts for use on the farm.

Aerial photographs for the entire district have been made available to the supervisors by the Soil Conservation Service under the terms of a written understanding. In accordance with the memorandum, the Soil Conservation Service has also provided detailed ground surveys showing soil type, degree of slope, amount of erosion and land use capability for farms of District cooperators.

With the aid of the photographs and the detailed surveys, the Soil Conservation Service technical men detailed to assist the district have worked out complete soil conservation plans for the fields and woodlands of 164 farmers who have requested such assistance with 111 of the plans being made last year. The 164 farms cover 38,760 acres. Up to the present, a total of 80 additional farmers have applied for similar assistance.

Included in the actual field work done so far to put these soil conservation plans into effect is a total of 18,270 linear feet of farm drainage ditches constructed, with 68,000 feet yet to be finished. In the Hinesburg section, nearly 2½ miles of a large community drainage channel has been excavated as well. Only 1½ miles of this excavation remains to be completed. This has already benefited 300 acres of land.

In addition, 16,150 linear feet of water-diversion ditches have been completed on hillside fields out of a total 133,120 feet agreed upon by farmers and the district. Nearly a thousand acres of sloping crop fields have been laid out and farmed on the contour to help prevent erosion. Four farm ponds have been completed in the past year out of a total of thirty-four called for in agreements. More than 1,000 acres of pasture have been improved by fencing, obstruction removal and the use of lime and fertilizer. Woodland management plans have already been carried out on 569 acres out of a total of 6,624 acres agreed upon. A total of 2,448 rods of new fence has been constructed. Such practices as strip cropping, hedgerow removal, sod waterways, streambank protection, spring development, tree planting and several others have also been put into effect on a number of farms. Altogether, conservation methods have been put into effect on 19,707 acres of land out of the total of 38,760 acres on the 164 farms already under agreement.

Results so far from the use of contour farming, strip cropping and diversion ditches show that average yields of grain increase about 15 percent per acre, silage corn 20 percent and hay about 20

percent, due to the saving of soil and moisture, and the longer growing season possible when the ditches dry up the land earlier in the spring. Of course, yield increases will vary from farm to farm. Fuel savings range from 10 to 25 percent on contour-farmed hill fields, it is reported, because all work is done on the level—across the slope—instead of up and down hill.

The production increases from drainage are much more startling. Even partial excavation of the LaPlatte river community drainage ditch in the vicinity of Hinesburg will result in making 780 acres of valuable low-lying land available for hay crops during 1944. This land formerly was idle because it was too wet to be used. Furthermore, some 300 acres of land formerly too wet for any crop but hay can be used for grain and corn during and after 1944. The cost to landowners for this improvement of their land by the community ditch varied between $3 to $10 an acre, depending on the benefit they derived.

Due to the present shortages of machinery, equipment and materials as well as the fact that skilled technical help is scarce and ordinary labor almost unobtainable, much work which should be done in the district will have to wait until after the war is over. In the meantime, of course, the district supervisors are pushing the kinds of work which bring the quickest returns in increased production and can be done with the materials, equipment and technical assistance that is available.

At present, the district has on hand the following equipment:

one 50 hp. caterpillar tractor
two small graders
one ⅜ yd. dragline excavator
one ¾ yd. dragline excavator
one 5-ton dump truck and trailer

The equipment now on hand is inadequate even to keep up with present work scheduled. At the present time, there is enough work planned to keep the tractor and small dragline busy for two years. The tractor is rather old and is quite inadequate for much of the work in the district. The small dragline will largely be used in 1944 to excavate ponds or small drainage ditches on individual farms while the large machine will be used exclusively to complete excavation on the community drainage ditch in the Hinesburg area and on lateral ditches necessary on adjacent farms. The 5-ton dump truck is inadequate to move much of this heavy equipment in rolling country.

In order for the district to operate efficiently in the near future, it will be necessary to secure the use of at least four tractors and bulldozers and additional trucks for towing the equipment. Additional machinery necessary after the war will include power shovels, a pile driver, bulldozers, dump trucks, caterpillar tractors, a scraper, an air compressor and a larger dragline. It is estimated, for instance, that the earth-moving work requiring a bulldozer would take one bulldozer working for more than 100 seasons, figuring that 800 hours work could be done in each season.

Several state, local and federal agencies gave valuable assistance to the supervisors in carrying out their program of work in the district. The Soil Conservation Service loaned or granted several pieces of heavy equipment and were able to make available a limited amount of trees, shrubs and seed of the kinds not locally available. Most important, they detailed four technical men to work full-time in the district and loaned the service of an engineer to help plan the Hinesburg drainage job. The county agricultural agents of Addison, Chittenden and Rutland Counties have given valuable help in holding educational meetings among farmers and arranging for tours and demonstrations. Some of the money for the Hinesburg drainage job was furnished to farmers by the local Production Credit Association and some of the towns loaned equipment to the district supervisors from time to time. The University of Vermont Agricultural College, including the Experiment Station and the Extension Service, has been extremely helpful in developing a pasture improvement program to help meet the troublesome grazing situation. Vo-Ag students and the schools in several towns engaged in specific conservation projects in their classes.

The State Highway Department gave the supervisors valuable help in completing the Hinesburg drainage project and farm foresters employed by the State and Federal Forestry Departments have given assistance to district farmers on woodlot management problems at the request of the district supervisors. The State Fish and Game Commission also rendered much assistance and advice in drainage and wildlife conservation.

"Poor soils make poor people and poor people make poorer soils. To have fertile soils we must add vegetable matter, lime, phosphate and potash to the soil in sufficient quantities to make it productive."—From a resolution passed by the board of supervisors, East Alabama Soil Conservation District.

Selective cutting on Cowlitz Project

Only 50 years ago this tract was a cultivated field. Today it yields 85- to 100-foot piling under selective cutting. It is on the Stewart Bush farm in the Cowlitz Farm Forestry Project, near Kelso, Wash. Bonneville right-of-way in foreground.

By FRANK B. HARPER and MAURICE C. BONNEY

The Cowlitz Farm Forestry Project, taking in nearly 270,000 acres in western and southern Cowlitz County, Wash., started in November 1941. Just about that time Max Dercum, forestry graduate of Cornell with one year postgraduate work at the University of California, found him-

EDITOR'S NOTE.—The authors are respectively, head, current information, Soil Conservation Service, Portland, Oreg., and project forester, Cowlitz Farm Forestry Demonstration Project, Kelso, Wash.

self in western Washington bent upon becoming a "dirt" forester. Attracted by the mighty sawmill production in the Longview-Kelso locality and by Cowlitz County's large volume of second growth Douglas fir, he stayed.

Stewart Bush, Dercum's teammate in the operation of logging equipment, is by contrast a farmer who lives on the place his father homesteaded in Hazelldell Valley about 8 miles north of Longview. It is on this farm that the two did their first cooperative cutting. They got out logs and piling under the best conservation methods for the war markets. Working closely with them in adapting methods of logging to the practice of forestry in second-growth Douglas fir is the project forester of the Soil Conservation Service, who is in charge of the project's administration.

The story of how the forester-farmer partners operated in Bush's own woodland reflects the problems and opportunities for profitable harvest of war-needed farm timber without needless slaughter of trees and without exposing the ground beneath to run-off and erosion. Though Bush is interested first in his herd of purebred Herefords—"don't call them 'whitefaces' "— 185 acres of his 240 acre farm is in woodland, timber that for the most part he has watched grow to saw size in his own lifetime.

"That woodlot up there where these pilings came from was just a clearing in my time and was farmed about 50 years ago," Bush recalled as he watched Dercum and hook-tender Frank Armstrong bring two 85-foot pilings into the landing with a tractor equipped with winch and dozer blade. "That piling is about 45 years old."

"This place is still referred to by old-timers as 'Burnt Hills', because a big forest fire went through here. The old stumps show there once was quite a stand of old-growth Douglas fir and cedar. This was all largely bare when my father moved up there from Coffin Rock on Cowlitz Flats in the big flood of '68, to have a place for his cattle. All this timber you see has come in as natural second growth. That slope there was all slashed and burned for pastureland in 1913, too, and was as clean as that power line clearing; and now you see that dense growth of fir."

The mud-chinked log cabin which stands between the old Bush house and the barn was on the homestead when the elder Bush, who died in 1928, took it up.

"We have the timber here," Bush said, "and I've always been thinking about getting something out of it. But when you sell to an operator who logs in the customary way, about all you have left after the little you get for the stumpage is waste timber on the ground, and your place all torn up. The way we are doing it now gives the farmer a chance to get his own labor into it and to get more nearly the real value out of his timber.

"We're making a selective cut in the stand," he added with obvious satisfaction, after calling attention to the dense stand on the formerly cultivated land. "We're taking around 3,700 linear feet of piling from about 10 acres. There is a lot more in there, but we are taking only the trees which will make this particular order."

Dercum pointed out that the piling had to meet size specifications and had to be straight, and that in cutting 46-to-100-foot piling the trees had been selected that would make the required piece without unnecessary waste in long butts.

The piling operations were of a fill-in nature, "taking up slack" for the major activity, as Dercum expressed it, while waiting for saw repairs for a small sawmill set up across the lane to turn the sawlogs into ties. As Bush pointed out, virtually none of the second growth had been taken off until recent years since his father followed the custom of other pioneers in the '70's and took off dead cedar for shingles. He remarked unenthusiastically that he also "tried selling a little stumpage."

Acknowledging the project forester's assistance, Dercum explained how he and Bush had pooled their funds to buy the equipment for this essential cooperative logging project, equipment that could

Partners in conservation logging: Farmer Stewart Bush and "Dirt Forester" Max Dercum.

not have been financed or have commanded priorities on an individual basis.

"Of course," the partners agreed, "we could just have made logs and trucked them out to other mills. Or we could simply have put them in the water. But we couldn't have utilized the timber so closely nor so profitably and left any trees standing for a second cut a few years hence. However, with the mill on the ground we can afford to utilize closely; we get the benefit of a short log scale, while logging the trees in long log lengths. We also get the benefit of whatever over-run there is in the cut of ties at the mill. Both slabs and sawdust are utilized since they are sold to buyers who remove the material from the mill and in turn dispose of it as fuel in Kelso and Longview. We truck the ties to the delivering point with the farm truck, which also adds to the total income from woodland."

The cut on this particular operation was figured roughly at a million board feet. Bush hastened to explain that, "We're going to have timber left when we get through with the cutting."

To this Dercum added, "Ordinarily the mill man buys the farmer's stumpage. We, however, retain ownership of the timber till it reaches the market. Under the conventional method of selling stumpage the only choice the farmer has was to turn his timberland over to the buyer and hope for the best. This way the owner retains control of his property by having the trees marked which he is willing to have cut, and both farmer and buyer are inclined to take more interest in making the thing go, for everything is on a more business-like basis. I see a real opportunity to demonstrate better cutting practices in second-growth Douglas fir through operations of this kind by lining up farm timber owners who are interested in the conservation of their timber. *The success of the whole approach hinges on the owner's willingness to make his timber accessible by paying the cost of building the necessary truck roads for logging selectively.* Otherwise, the operator must build the roads, which has the effect of immediately increasing the value of the farmer's timber and at the same time putting the owner in a poor bargaining position. The latter has no right to expect the operator to agree to a limitation of the trees to be cut from the stand. In other words, the stumpage owner has been following the practice for years of trading the future value of his stand of timber for a road which turns out to be valueless to him after the logging has taken place.

The farm forestry project is designed to put a stop to destructive scenes like this. Here's what happened when a 45-year-old stand of Douglas fir was clear-cut by donkey and spar tree at the very time Bush and Dercum were harvesting piling and tie logs without waste a few miles away. Probably one out of 20 trees in this stand were of merchantable size, but virtually all trees in a 10-acre tract were broken down by high-lead logging.

"When both the owner and the logger are interested, it is a good arrangement. It has to be a long-term affair and more than an experimental type of operation, for even the second-growth stands are becoming pretty well cut over. It is important for the owner to make it his business to know when and how much timber should be harvested to keep the stands in production."

This is something of "a new wrinkle" in the smaller West Coast timber operations. Dercum and Bush probably made a clearer statement of the case from the forestry and soil conservation standpoints than could the project forester himself.

Too often in the past the small woodland owner never has had logging operators available with the interest of the timber stand or of the land at heart. This kind of operation tends to point the way for both profitable and good forestry practice on West Coast lands. More owners are becoming interested in their woodland, are beginning to dictate which trees they are willing to sell and which ones must be left in good condition for future growth.

"We're going to find out a lot about what can be done on the business end of the enterprise, by keeping complete cost records," says Dercum. "This enables us to arrive at the most efficient methods for this type of logging. So far there seems to be no reason to doubt the practicability of cutting second-growth Douglas fir in such a way as to permit a number of subsequent cuts on the same area. We are now acquiring a light logging arch suitable for handling second-growth logs which should make it possible to yard much more efficiently and at the same time keep our roads in better shape. The addition of this piece of equipment should provide us with a flexible and complete outfit for meeting the forestry needs of other woodland owners in the farm forestry project. Aside from the tractor and arch, we have a dual-wheel, single axle, flat-bed trailer which facilitates the moving of the tractor so that small jobs of yarding and road-building can be accepted; and, a 2-ton logging truck, and single axle trailer suitable for hauling logs up to 32 feet long."

Some of the Bush piling, straight and cut to size, on its way to the landing.

Dercum's first venture into the local cooperative logging field was on the Henry E. Bodine place, before he and Bush procured the new, up-to-date tractor. The cut and selling figures boiled down to $1,150 which the farm timber owner took in on an operation that would have brought him only $253 if he had sold the same timber as stumpage.

The Cowlitz Farm Forestry project has 103,000 acres in small, private holdings with fairly large woodlands of mostly second-growth Douglas fir. The 1,900 farms in the project area comprise 112,000 acres, of which 70 to 77 percent is in woods. The entire area was cut over 40 to 50 years ago, in the days of oxen and greased skid, but there has been good natural restocking.

One of the main problems complained of has been "gyppo" logging along the highways. This is on the increase in recent years, with much of the stumpage sacrificed at less than the true value to the owner and at the additional cost of windthrow and fire hazards.

The object of the cooperative farm forestry project is good land use. Emphasis is on intensive woodland management on individual farms: "Develop to its sustained maximum the contribution which farm woods make to the economy, comfort and permanence of the farm as a whole." That is why the project's program is concerned, as well, with erosion control and related conservation problems on dairy farms in the valleys and the cut-over hilly lands.

The genuine cooperative feature of the project, aside from such working examples as the Bush-Dercum partnership, is indicated in the contributions by local, state and federal groups, such as the Washington State College Department of Forestry, farmers themselves, and the county commissioners, who furnish supplies, office space in the court house, and other services. Also cooperating are County Agent Claude S. Anderson, the Cowlitz County Forestry Education Committee, the State Fish and Game Department, the Bureau of Agricultural Economics, the AAA and the Farm Security Administration.

The State Agricultural Experiment Station is the state agency responsible for farm forestry research particularly respecting cooperative marketing and pooling, the value of products, the probable economic returns, and the growing and harvesting of cascara, Christmas trees and the like.

The State Department of Conservation and Developments cooperates through the local fire warden, Ammon Beede; and the U. S. Forest Service is authority for forestry subject matter and for farm forestry research through the Pacific Northwest Forest and Range Experiment Station. The Soil Conservation Service administers the project, handles farm planning, and provides project personnel and some equipment.

The farm forestry program for the state was drawn up in December 1939 by the State Farm Forestry Sub-committee and the State Land Use Planning Committee. Cowlitz County was selected as the first priority for such a project the next spring, because of such considerations as roads to markets, climatic and other conditions, the numerous farmer-owned woodlands and so on.

Though the primary aim of the project is to demonstrate and encourage widespread adoption of better cutting practices, using the owners' own labor and treating the farm woodland as a permanent, income-producing "crop", a plan is worked up for each entire farm, based on the ability of the land to produce this or that crop, according to its soil type, slope, erodibility and other factors.

Other farm forestry demonstration projects on the West Coast whose activities are being followed with interest by small private and large commercial timber interests alike are: Sonoma, Sebastapol, Calif.; Eldorado, Placerville, Calif.; Kootenai, Coeur d'Alene, Idaho; and Clackamas, Oregon City, Oregon.

Proud is Bush of his Herefords. His calf crop is close to 100 per cent. He figures on running about 25 breeding cows.

FARM FORESTRY BUILDS A NEW CANNERY

By A. C. McINTYRE

When, in December 1942, a disastrous fire struck a canning company's plant at Biglerville, Pa., the phoenix-like rise of a new plant from the ashes of the old one was made possible because two years before the Soil Conservation Service and the Pennsylvania Department of Forests and Waters had jointly inaugurated a farm forestry project in Adams county.

The apparently unrelated and unusual chain of events which lead to the rebuilding of the cannery was actually not unusual, but rather typical of the services of the farm forestry project to farmers and wood-using industries in the county.

The president of the company, I. Z. Musselman, has for some years been assembling a large acreage, most of which he has kept in orchards and woodland. In 1941, D. E. Hess, farm forester of the Adams county project, approached Musselman and pointed out the advantages of planting orchards on the contour and of developing a program of good woodland management. The latter, Hess showed, not only would make the best possible use of the woodland resources but would also make it possible to employ many key laborers from the company who were not needed except during the canning season.

EDITOR'S NOTE.—The author is regional forester, Soil Conservation Service, Upper Darby, Pa.

Musselman, Hess, two other officials of the company, and the farm superintendent, made an inspection of three orchards in Adams county where the trees had been planted on the contour. Eventually, Musselman asked the Soil Conservation Service to lay out 34 acres of cherry orchard on the contour. This was in the fall of 1941. The following fall, 91 acres of apple orchard were laid out similarly.

By then Musselman's holdings also included 300 acres of woodland. An active woodland management program had not yet gotten under way because available labor was needed for clearing brush, pruning and improving the various orchards. In the fall of 1942 an inventory of the woodland was made in cooperation with the Pennsylvania Department of Forests and Waters, which furnished two foresters for the work.

This inventory had barely been completed when, on December 3, 1942 fire destroyed practically all of the buildings and equipment of the canning company, valued at from $175,000 to $200,000. The company officials made arrangements with another cannery to handle their 1943 production, but they were at a loss to know how to rebuild the plant. They had in mind steel and concrete, materials which probably could not be obtained until after the war. At this point Farm Forester Hess suggested that they consider a plant of wood construction. He pointed out that not only could wood materials be obtained, but that these probably could be had in large part from the company's woodland tracts. In short, he suggested rebuilding with lumber, trusses and other timber cut from the firm's own trees.

The company consulted an architect and a construction company specializing in wood construction. Favorable reports were forthcoming. Next problem was to get a sawmill operator who would in effect "custom saw" the Musselman wood tracts. When this proved impossible, Hess suggested that the company purchase a sawmill and do its own sawing. This idea met with favor, and permission to purchase a mill was asked of the War Production Board. The application was accompanied by a statement from the farm forester showing that the entire 300 acres of woodland would be harvested selectively and that all material not used in construction of the cannery would be sold to wood-using industries working on war orders. The War Production Board approved the application in May 1943 and the mill was delivered and set up during the first week of July. Meanwhile, the problem of a sawyer was solved when a part-time employee of the company, who had operated a sawmill for 20 years, agreed to do the work.

Hess marked the first 50,000 board feet of standing timber for cutting, and the sawmill got busy, with one of Musselman's tractors furnishing the power.

Two new problems immediately arose. First, a log wagon was needed for the heavy timber. This problem was solved by borrowing a wagon from another sawmill operator for long enough to get the largest timber out. Later, at the farm forester's suggestion, the chassis of an old truck was adapted to the purpose.

The second problem was to organize an efficient logging crew. Of 15 men available, only two had had any previous logging and sawmill experience. The value of training this inexperienced but willing crew is shown by the reduction in production costs from $35 or $40 per thousand board feet, during the first two weeks of operations, to an ultimate $18 per thousand for cutting, logging, sawing and stacking. Stacking of the lumber for seasoning also required close supervision by the farm forester, but proved well worth while. Some of the lumber was seasoned for 8 or 9 months, and the building contractor expressed his satisfaction at having seasoned material with which to work.

Sawmill and wood harvesting activities were carried on alternately with the orchard and canning operations during the fall of 1943 and the winter and spring of 1944. The farm forester, meanwhile, had marked for cutting the trees on the remaining areas. To date 255,000 board feet of lumber have been sawed. Of this, 203,000 board feet have gone into the construction of the plant. A further 10,500 feet went into 300 ties which were used for a railroad siding to the plant.

The company plans to build a warehouse later, and as soon as definite plans are made and the bill of materials calculated, the necessary lumber will be sawed and stacked for future construction. After the lumbering operations are completed, it is planned that pulpwood and fuelwood cutting will be systematically carried out, so that from then on, the woodlands will be harvested on a sustained-yield basis. In addition to the lumber used by the cannery, 41,500 board feet of lumber valued at $2,150 have been sold to defense industries. Furthermore, 200 cords of slabwood and topwood have been sold for $1,075.

When Farm Forester Hess asked Musselman the value of the lumber used so far, the company official replied: "In the first place, I have no idea where I could have purchased this lumber, and if it could have been bought, it very likely would

have cost from $90 to $110 per thousand board feet. My records show that the lumber actually cost approximately $25 per thousand board feet, exclusive of stumpage value."

The markets for the material not used in plant construction were found by the farm forester. This assistance in obtaining a market, like the other services which the Adams County farm forestry project has extended to the canning company, is available to any farmer in the county. Such assistance and technical guidance in selecting trees to be cut and other steps in good woodland management have already been given to nearly 100 Adams county farmers, and it is expected that this figure will eventually be doubled. Woodland management plans prepared by the project range in size from a few acres to several hundred. In the three year 1941-43 harvesting of woodland products on cooperating farms brought a gross income of $45,165. The average net income from woodland products for the year 1943 on cooperating farms where harvesting took place during that year was $181. This return in actual dollars and cents proves that intensive forestry management is a profitable proposition. In fact, the experience of farmers who have been helped by the Adams county project indicates that if the services of the project were not available, it might well pay them to hire a professional farm forester.

The Adams county project is not only helping farmers and others to realize a considerable immediate return from their woodland, but equally important, its advice and assistance in all phases of good woodland management will make it possible for farmers in the county to secure a continuing and profitable harvest of timber year after year.

Hardly less important is the fact that any farmer who wishes can also have prepared through the project a complete soil conservation plan for his entire farm. Musselman's contoured orchards are just one example of this. He now owns nearly 1,000 acres of orchard, of which more than 250 acres are planted on the contour. As the older square-planted orchards are taken out, they too will be replaced by contour plantings. On other cooperating farms, conservation practices such as contour strip cropping, good pasture management, and the use of diversion ditches and terraces are being adopted side by side with the farm's woodland management program.

CONTRACTORS DISCOVER SOIL CONSERVATION DISTRICTS

By A. E. McCLYMONDS

Private contractors have discovered soil conservation districts in the Northern Great Plains Region as a medium to enable them to do relatively small jobs on individual farms at reasonable prices and still produce reasonable earnings.

The first private contract in this region was let by the supervisors of the Brule-Buffalo soil conservation district in central South Dakota for the construction of a specified number of stock water dams. The supervisors made arrangements with the local bank so that cooperators could finance construction, and required deposit of the full estimated cost before work was begun. The contractor received 80 percent of the cost as each dam was finished and accepted by the district, and the remainder when the contract was completed. That was three years ago. The plan still works.

Other districts followed suit and today more than a score deal with private contractors. The Mouse River soil conservation district in North Dakota contracted for enough dugouts to warrant moving a drag-line in, whereas individually no single unit could have financed such work. In the Franklin County soil conservation district in Kansas, surface drainage jobs on cooperators' farms are done by a contractor, who in turn, when approached by individuals, asks farmers to have a conservation plan made first. This spring, the Box Elder soil conservation district in southwestern Montana advertised for the moving of 200,000 yeards of earth, and has since let the contract.

Contractor associations are interested. In South Dakota a resolution was adotped urging contractors to cooperate with soil conseravtion districts. The Nebraska association's secretary keeps contractors posted on district opportunities. This spring the Wyoming association listened to one who had worked with a district, and asked for more information.

The Wyoming contractor pointed out that cooperation with soil conservation districts is advantageous because it will give a longer period of use for equipment and a more steady income, con-

Editor's Note.—The author is regional conservator, Soil Conservation Service, Lincoln, Neb.

trasted with large earnings for a short period and then idleness and no income for the rest of the time.

Contracting construction work also frees the technicians' hands so that full time can be spent on farm planning and getting conservation practices on the land. Supervisors have commented on this especially.

Farm Pond Fights Fire

By MELVIN BLISH

Any farm pond which is near a building is a potential piece of fire fighting equipment, even though it is primarily intended for other purposes, such as stock water, fish production or recreation. This extra protective value which a farm pond can offer was strikingly demonstrated on a York County, Pa., farm this summer. Master farmer James K. Rishel, of Glen Rock, had the fortunate experience of seeing his farm pond completed ahead of schedule and just in time to supply firemen with the water needed to save his home and several other buildings from destruction.

When Rishel first discussed the possibility of constructing a pond with technicians of the York Soil Conservation District, he had particularly in mind fish production and recreation. The district prepared the plan for the pond and agreed to supply fish for stocking it. Rishel employed a private contractor to construct the dam. The contractor, happily, contrived to finish the work about a month ahead of schedule. A short time later, fire broke out at night in the barn. The best efforts of two fire companies could not save the barn or a nearby granary. But, because they had an unfailing supply of water to draw on, the fire was kept from spreading to the Rishel homestead and other buildings. After five hours of steady pumping, the level of the 400 x100 foot pound was lowered only six inches.

Rishel became a cooperator of the York District in January 1940, and has since installed a large proportion of the conservation practices called for in his farm plan. To the contour strips, the tile drains, improved pasture and woodland which help make up his soil conservation pattern can now be added the farm pond which already "has more than paid for itself."

EDITOR'S NOTE.—The author is district conservationist, York (Pa.) Soil Conservation District.

"Fertile soils produce prosperous citizenship in any community, county, state or nation.—Board of supervisors, East Alabama Soil Conservation District.

(*Continued from page* 93)

To use the bigger and better pastures and the greater amount of feed and hay grown, the farmers have increased their livestock: 48 percent more dairy cows; 173 percent more beef cows; 132 percent more brood sows; 65 percent more chickens; 201 percent more ewes.

Averaging production from crop and grazing land, the increase is 28 percent. In effect the 454 conservation farmers have added the production of 28 percent more acres, without buying another foot of land.

Applied to the 11 million acres of the Blacklands, this would mean the equivalent of production from 3,111,360 extra acres—or the enlargement of each 160-acre farm to the productive capacity of a 204-acre farm under the old methods!

What about labor and equipment costs of working conservation treated fields? Of the 454 men, 117 replied the conservation program saved both labor and the use of farm machinery—a saving amounting to $12,592 annually. Wallin's reply was that no labor has been saved but that equipment costs are less because operations are on the contour or level. He has found soil conservation farming to be profitable, any way it's figured.

REVIEWS

BUREAUCRACY: A CHALLENGE TO BETTER MANAGEMENT. By J. M. Juran. Harper and Brothers, New York. 1944.

" . . . The Government population could be cut in half, and this while performing all the present functions with at least present effectiveness."

Such is the startling epilogue—not of a Congressional investigating committee nor of a political phrasemaker, but of a federal employee, a fellow-member of this bureaucracy called the United States Government. And Mr. Juran backs up his conclusions in eight short chapters packed with good, common sense, touched up with a spirited realism that makes this self-styled "treatise on the nature of the bureaucratic world" not only penetrating and analytical but also delightfully readable.

To achieve the herculean task of shrinking the government population without impairing its effectiveness, Mr. Juran simply prescribes *"the utilization of scientific principles in government to the same extent as is today practiced in progressive industry."*

Thus speaks Mr. Juran, the management philosopher. Juran the realist, however, recognizes the road ahead as an obstacle race, full of ruts (decidedly) and pitfalls. He

is thoroughly aware of the giant size and complexity of the organism that Congress (the "god" of the Juran vocabulary) creates and then rares back and views with alarm, occasionally succumbing to the natural urge to slash at the periphery with a "meat-axe" abandon that may indeed nip off vital tissues as well as unnecessary padding.

He knows about that nefarious practice of duplication which he labels "the common cold of the bureaucratic world" and the development of which he ascribes to the basic human desire for self-sufficiency. This self-sufficiency, he says, becomes the umbrella which the weather-wise bureaucrat has found indispensable when storms of criticism or clouds of investigations appear on the horizon. And he has also run into the bureaucrat who agrees that avoidable duplication is present but insists that "the way to cut it out is for those other guys to quit duplicating what I am doing."

The author's treatment of such thoroughly aired items as "red tape and systems" is refreshingly different. He describes red tape as "the popular phrase for a series of diseases which arise from identifiable and curable specimens of management germs." And he goes on to identify those germs by flitting easily from analogy to analogy.

There are too many "post offices," he says, through which vital information must be cleared and stamped before reaching its ultimate objective. Similarly, there is too much "stratification"—too many layers through which action has to travel up and down and back up again, leaving the man at the foot of the organization deprived of all discretion and initiative. The federal government is visibly suffering, he feels, from the theory of "no errors at all costs," a theory exemplified by a complete and detailed auditing of travel vouchers even though the amount disallowed is far less than the salary of the auditors. And he decries the governmental using of standard battle-sized equipment to eradicate large-scale swindles as well as to ferret out 25 cents excess taxi fares.

If the author had stopped with his critical analysis of the management ills of our federal society, his book would still be of considerable value. But the other half of the title, "the challenge to better management," is by no means left unsupported. He quickly disposes of the quack remedies, the popular myths of management, such as the "one-central-agency" theory or the Presidential edict as a complete cure-all for the existing bureaucratic confusion. The job of effecting the cure, he says, is a task that is *"enormous, intricate, work-consuming, and time-consuming."*

The Juran-recommended cure consists of a five-point program of utilizing tools of scientific management:

1. A management policy for the federal government; 2. and 3. development of intra- and inter-agency means to carry out the policy; 4. collection, adaptation, and dissemination of management techniques; and 5. development of competition to stimulate suggestions and improvements. Doubtless, these have been heard of before, but, as explained by Juran in the light of the myths and obstacles prevalent in the bureaucratic world, for once they are fired with sparks of realism.

All in all, Mr. Juran's treatise on bureaucracy is recommended reading, both for the bureaucrats themselves and for the bureaucritics—which just about covers the waterfront of the reading public.

—VERNA C. MOHAGEN

BIOLOGY FOR BETTER LIVING. By Ernest E. Bayles and R. Will Burnett. Silver Burdett Company, New York. 1941, 1942. 754 pp.

In adapting the curriculum to the practical needs of future citizens in a democracy, educators always have been confronted by a serious problem in finding suitable textbooks and teaching guides. "Biology for Better Living" is an outstanding contribution toward meeting this need in high schools and junior colleges. The authors have designed it to develop insight and understanding. Among students who will have to participate in the reconstruction of a world in which change is constant and normal.

The studies deal with active problems in such a way that students should accept them as challenges and press for their solutions. After an inspiring introductory unit dealing with "Biology—A Study of Life" and "Science—A Method of Obtaining and Testing Knowledge," Unit One devotes six chapters to "Problems of Good Land Use." The chapters in this unit include "The Soil, Our Heritage," "The Formation and Composition of Soil," and three chapters dealing with the relation of plants to soil, with a final chapter titled "To Save Our Land," in which the conservation of farm lands and the functioning of the soil conservation districts are described. The book closes with the unit, "Conservation of Our Biologic Wealth" in which "The Control of Pests" and "Wildlife Conservation" are dealt with understandingly.

The text deals with a variety of biological questions in a similarly practical way, revealing unit by unit such scientific information as how living things are adapted for the lives they lead, how living things may be developed and improved, relationship of the body to food and environment, preventing and combatting disease, and the care of injuries.

Many of the chapters touch upon the subject of conservation which is emphasized in both the opening and closing of the book.

Subjects discussed in the text are introduced with a question or statement of a problem, after which the text proceeds with alternate consideration, to finally reach a conclusion or generalization. Historical light is thrown here and there on present problems, but always interestingly. No attempt is made to explain all the mysteries of life. Rather the progress of discoveries to date is unfolded and the unproven future is left as a challenge to young scientists.

Throughout the text excellent illustrations are used including reproduced photographs from many sources that make each biological lesson a live subject. Instead of merely explaining a scientific fact the caption of each illustration includes one or more thought-provoking questions.

A glossary of 462 biological terms is helpful to students.

Conservationists will be especially interested in becoming acquainted with "Biology for Better Living" because of the frequent requests they receive for suitable information on soil and water conservation for use in schools. "Biology for Better Living" states the general problems and general solutions, lays an excellent foundation for understanding local problems in land use and soil and water conservation, and will stimulate interest in active programs for the solution of these problems.

—EDWIN C. HOLLINGER

REFERENCE LIST ☆☆

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